

## REMARKS

Applicant respectfully submits that the present invention is distinguishable over each of the prior art references cited by the Examiner, and in support presents the following arguments.

### **Response to 35 U.S.C. § 102 Rejection**

#### **Independent claim 2 – Klein '405**

Applicant respectfully submits that independent claim 2 contains elements not found in Klein et al (US 5,468,405) ("Klein"). Claims 4, 16 and 19-23 depend from claim 2 and therefore incorporate the same limitations as the independent claim 2.

Claim 2 requires a composition including reaction products from a reaction of a ricinoleic acid with a compound containing a hydroxyl functional group in the presence of a phosphorus-containing acid, the reaction products including a transesterified fatty acid ester and a phosphorus-containing compound. The language of the claim requires that the reaction take place with three specific compounds present. As the Examiner noted, Klein teaches a reaction of two compounds, namely, castor oil and an acidic catalyst such as phosphoric acid. Klein then discusses mixing, not reacting, the resulting Klein product with any of a laundry list of components. Klein's resulting product is not a transesterified fatty acid ester but a mixture of the dehydrated castor oil taught in Klein with any number of other components.

Klein solely describes a process of dehydration of castor oil under conditions optimized to prevent polymerization. No transesterification with exogenous alcohols is possible because alcohols are never added for reaction. Therefore, Klein is missing at least two of the required elements of claim 2, namely the reaction of a compound containing a hydroxyl functional group and a reaction product including a transesterified fatty acid ester.

The difference between the Klein teaching and the invention (called the Thermolube Patent Transesterification) is exemplified with the two reaction schemes shown below starting with the identical reactant shown in the middle.

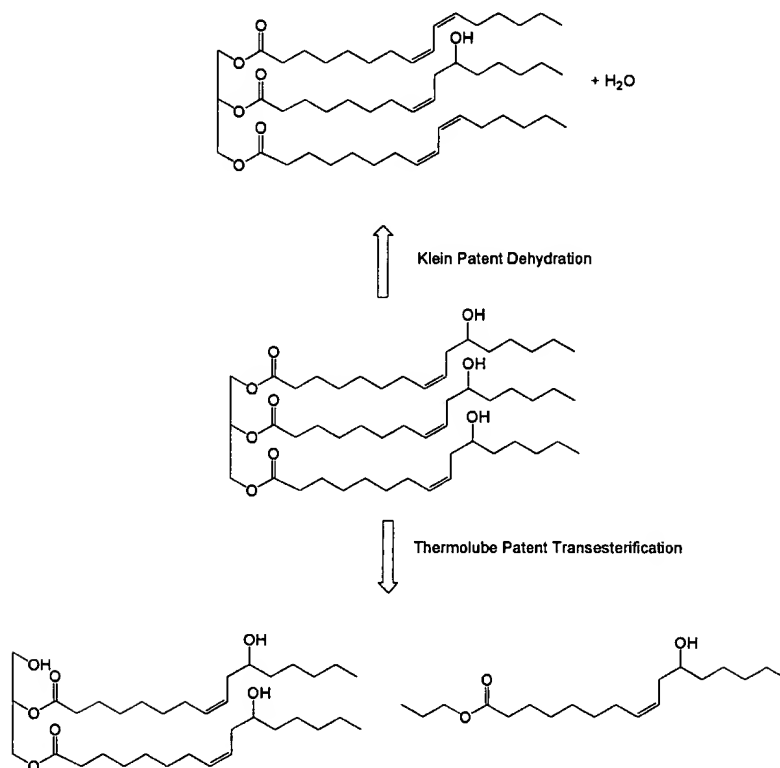


Diagram 1

The above diagram is the commonly understood reaction path of the reactions described and is used merely for illustrative purposes.

In the office action at issue, the Examiner did not indicate where the Examiner found a reference to a compound containing a hydroxyl functional group that takes part in a reaction with castor oil and phosphoric acid. Applicant believes that the Examiner relies upon a reference to column 2,

lines 40-44 indicating that the partly dehydrated castor oils of Klein may be used with known base oils, such as mineral oils, synthetic ester oils of dicarboxylic acids and alkanols or dicarboxylic and monocarboxylic acids and alkanols and with natural esters, such as triglycerides. If Applicant has misunderstood the Examiner's reference, then clarification by the Examiner is respectfully requested. Alkanols discussed in Klein at col. 2 are mixed after the initial Klein reaction of only castor oil and phosphoric acid. Klein merely identifies that the dehydrated product resulting from the invention might be mixed with any number of known lubricants. This physical mixture of alcohol and dehydrated castor oil is completely different from the transesterified fatty acid ester resulting from and required by claim 2. Not only does the proposal of mixing an alcohol with a dehydrated castor oil not teach the reaction of that alcohol with castor oil in the presence of an acid, but also Applicant believes there are no physical conditions under which this mixture could take place that would result in the reaction and reaction products claimed by Applicant. Dehydration is a process that in no way resembles transesterification. Dehydration is an elimination reaction wherein one molecule undergoes reaction to form two or more molecules; transesterification is formally a substitution reaction wherein two molecules exchange atoms to form two new products. Therefore, Klein and Applicant are not even practicing analogous art. Applicant believes that the resulting reaction product claimed in claim 2 will have a hydroxyl number that is relatively similar to the hydroxyl number of the castor oil reactant. Klein, on the other hand, teaches the reduction of the hydroxyl number of the castor oil reactant to a value of 90 – 150 KOH/g. This is consistent with the teaching of dehydration in Klein. As can be seen in exemplary Diagram 1, the reaction of Klein demonstrates a reduction of the number of hydroxyl groups of the castor oil whereas the current invention (Thermolube) does not anticipate a reduction of the number of hydroxyl groups.

Diagram 1 also demonstrates that transesterification is not anticipated as part of the reaction path for Klein. Therefore, elements of claim 2 are missing from the teaching of Klein.

In summary, Klein teaches a dehydrated molecule derived from the starting castor oil whereas Applicant teaches a new chemical entity by virtue of a transesterification process. While the exact elements of claim 2 that are missing in Klein have been discussed above, general differences in the teachings of Klein and the invention are discussed below in order to demonstrate that these reaction paths teach away from each other. Some of the distinctions between the process to create the desired product are:

Klein	Applicant
Klein seeks to increase the number of double bonds.	Thermolube <u>avoids</u> effecting the number of double bonds and instead is directed to partial ester cleavage through transesterification.
Klein seeks to produce and eliminate water.	Thermolube is directed to novel propylesters and diesters of castor oil and is not directed toward the production and elimination of water.
Klein seeks to decrease the number of hydroxyl groups on the starting triglyceride.	Thermolube seeks to maintain the number of hydroxyl groups and double bonds on the sidechains of the starting triglyceride and to form novel <u>transesters</u> .

While Klein and Applicant both investigate a reaction product starting with castor oil that may act as a lubricant, this is where the similarity ends. Klein does not teach reaction products from a reaction of a ricinoleic acid with a compound containing a hydroxyl functional group in the presence of a phosphorus-containing acid nor does Klein teach reaction products having a transesterified fatty acid ester and a phosphorus-containing compound. As such, Klein does not teach all of the elements of claim 2.

### **Response to 35 U.S.C. § 103 Rejection**

Applicant respectfully submits that dependent claims 5, 9, 11-13, 24, 25, 32-38, 40, 44 and 46-48 are distinguishable from Klein combined with the knowledge of one of ordinary skill in the art.

As noted above, Klein is missing multiple elements of independent claim 2. Claims 5, 9, 11-13, 24, 25 32-37 depend from claim 2 and incorporate all of the limitations found in claim 2. Therefore, these claims are believed patentable over Klein in view of the level of ordinary skill in the art.

### **Independent claim 38 – Klein '405**

Claim 38 requires the reaction of three reactants, namely, ricinoleic acid, alcohol and phosphorus-containing acid. As noted above, Klein discusses the reaction of ricinoleic acid with phosphorus-containing acid but does not react alcohol as part of this reaction. Therefore, Klein is missing the third reactant as taught in claim 38. While Klein gives brief reference to mixing an alcohol with the product resulting from the initial reaction, there is no indication that a reaction takes place. As described above, Applicant believes that no reaction would take place upon mixing an alkanol with the dehydrated castor oil of Klein. The specification of Klein

clearly teaches mixing and not reacting as the various components listed for mixing act as carriers, not reactants. Claim 38 specifically requires that there be three identified reactants. Therefore, the language of claim 38 requires that all three components react. The claim as currently amended reads:

38. (Currently amended) A composition resulting from the mixture of reactants, the reactants comprising:

25 mol %-36 mol % of ricinoleic acid ;  
58 mol% - 62 mol% of alcohol; and  
0.8-10 mol % phosphorus-containing acid.

We believe that a typographical error was made in the phosphoric acid range and that it originally should have read .8 – 10 mol %. Instead, the decimal point was inadvertently left out resulting in a range of 8-10 mol %. This same range was then reflected in the specification. Both the claim and the specification have been amended above in order to correct this clerical error. Please note that the Examples shown in the specification directly support .8 mol% phosphorus-containing acid. When we make this correction in the claim and in the specification that matches this claim, then the examples fall within the corrected range. As the remaining claims depend from and incorporate the limitations of claim 38, these claims are believed patentable for the same reasons.

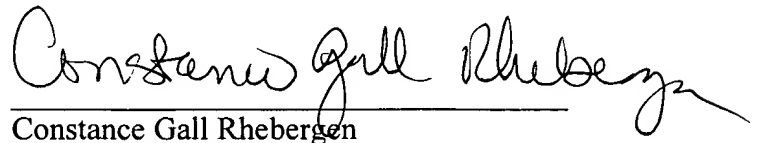
In commenting upon the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the references and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims. Not all of the distinctions between the prior art and Applicant's present invention have been made by Applicant. For the foregoing reasons, Applicant reserves

the right to submit additional evidence showing the distinctions between Applicant's invention to be unobvious in view of the prior art.

The foregoing remarks are intended to assist the Examiner in re-examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered to be exhaustive of the facets of the invention, which render it patentable, being only examples of certain advantageous features and differences that Applicant's attorney chooses to mention at this time.

Reconsideration of the application and allowance of all of the claims are respectfully requested. In view of the foregoing Response, Applicant respectfully submits that all of the claims are allowable, and Applicant respectfully requests the issuance of a Notice of Allowance. Should further discussion regarding the application be desired by the Examiner, a telephone conference is respectfully requested. I can be reached at (713) 221-3306.

Respectfully submitted,

  
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